

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method for identifying an unknown material comprising:
 - obtaining a multi-order spectrum from a sample of said unknown material, wherein the multi-order spectrum comprises a plurality of simultaneously obtained diffraction orders;
 - comparing the obtained multi-order spectrum to multi-order spectra for known materials; and
 - outputting an identification of the sample based on a correlation between the multi-order spectrum from the sample and the multi-order spectra for the known materials.
2. (original) The method of claim 1, further comprising outputting one or more next closest identifications based upon the correlation between the multi-order spectrum from the sample and the multi-order spectra for known compositions.
3. (original) The method of claim 1, wherein the correlation is a linear and a rank correlation. ’

4. (original) The method of claim 1, wherein the correlation is a statistical correlation.

5. (previously presented) The method of claim 1, further comprising building a library of spectra for the known materials.

6. (original) The method of claim 1, wherein the comparison can be performed against a spectral library or a portion of a spectral library.

7. (previously presented) The method of claim 1, wherein the multi-order sample spectrum comprises at least a first and a second order spectra.

8. (previously presented) The method of claim 1, wherein the multi-order sample spectrum comprises all spectra.

9. (original) The method of claim 1, further comprising outputting a correlation coefficient.

10. (original) The method of claim 1, further comprising displaying a summary of the correlation.

11. (currently amended) A system for identifying an unknown material comprising:

a spectrometer adapted to obtain a multi-order spectrum from a sample of said unknown material, wherein the multi-order spectrum comprises a plurality of simultaneously obtained diffraction orders;

a correlation module adapted to compare the obtained multi-order spectrum to multi-order spectra for known materials; and

an output device adapted to output an identification of the sample based on a correlation between the multi-order spectrum from the sample and the multi-order spectra for the known materials.

12. (currently amended) The system of claim 11, wherein the output device outputs one or more next closest identifications based upon the correlation between the multi-order spectrum from the sample and the multi-order spectra for known materials.

13. (original) The system of claim 11, wherein the correlation is a linear and a rank correlation.

14. (original) The system of claim 11, wherein the correlation is a statistical correlation.

15. (previously presented) The system of claim 11, wherein the output device as adapted to build a library of spectra for the known materials.

16. (original) The system of claim 11, wherein the comparison can be performed against a spectral library or a portion of a spectral library.

17. (previously presented) The system of claim 11, wherein the multi-order sample spectrum comprises at least a first and a second order spectra.

18. (previously presented) The system of claim 11, wherein the multi-order sample spectrum comprises all spectra.

19. (previously presented) The system of claim 11, wherein the output ~~module~~ device determines and outputs a correlation coefficient.

20. (previously presented) The system of claim 11, wherein the output device cooperates with the correlation module to display a summary of the correlation.

21. (currently amended) A system for identifying an unknown material comprising:

means for obtaining a multi-order spectrum from a sample of said unknown material, wherein the multi-order spectrum comprises a plurality of simultaneously obtained diffraction orders;

means for comparing the obtained multi-order spectrum to multi-order spectra for known materials; and

means for outputting an identification of the sample based on a correlation between the multi-order spectrum from the sample and the multi-order spectra for the known materials compositions.